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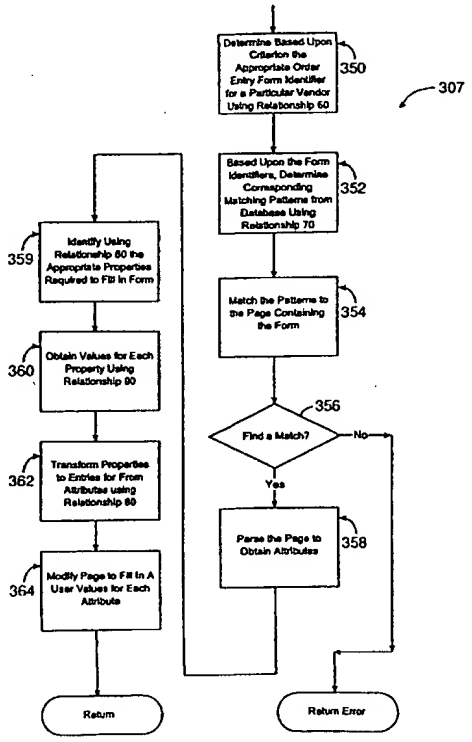
(54) Title: METHOD AND SYSTEM FOR AUTOMATICALLY FILLING FORMS IN AN INTEGRATED NETWORK BASED TRANSACTION ENVIRONMENT

(57) Abstract

A method of automatically filling in on-line forms presented by web pages in an internet transactional environment by determining (350) based upon selectable criteria a form identifier corresponding to a particular on-line form, and thereupon, for each form so identified, indentifying (352) one or many corresponding match patterns (354) with which a page containing a target on-line form is parsed (358) to obtain a plurality of attributes, and thereupon, for each attribute obtained in the parsing step, indexing into a database to obtain (360) and then appropriately transform (362) user information which may be used to fill in (364) the target form.



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METHOD AND SYSTEM FOR AUTOMATICALLY FILLING FORMS IN AN INTEGRATED NETWORK BASED TRANSACTION ENVIRONMENT

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CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority from the following U.S. Provisional Applications, the disclosure of which, including all appendices and all attached documents, is incorporated by reference in its entirety for all purposes:

U.S. Provisional Patent Application Serial No. _____, Anand Rajaraman, et. al. entitled, "Method and System for Integrating Transaction Mechanisms Over Multiple Internet Sites," filed March 9, 1998, (attorney docket number 17907-15.0); and

U.S. Provisional Patent Application Serial No. _____, Anand Rajaraman, et. al. entitled, "Automatically Filling Forms," filed March 11, 1998, (attorney docket number 17907-16.0).

The following two commonly-owned copending applications, including this one, are being filed concurrently and the other one is hereby incorporated by reference in its entirety for all purposes:

U.S. Patent Application Serial No. _____, Ashish Gupta, et. al. entitled, "Method for Integrating Transaction Mechanisms Over Multiple Internet Sites" (attorney docket number 17907-15.10); and

U.S. Patent Application Serial No. _____, Ashish Gupta, et. al. entitled, "Method for Automatically Filing Forms in an Integrated Network Based Transaction Environment," (attorney docket number 17907-16.10).

This application makes reference to the following commonly owned U.S. Patent Applications, which are incorporated herein in their entirety for all purposes:

Copending U.S. Patent Application Serial No. 08/724,943, in the name of Ashish Gupta, et. al., entitled "Method and Apparatus for Structuring the Querying and Interpretation of Semistructured Information," relates to information retrieval and interpretation from disparate semistructured information resources; and

Copending U.S. Patent Application No. 08/995,868, in the name of Ashish Gupta, et. al., entitled "Method for Data Gathering Around Forms and Search Barriers," which relates to submitting forms to gather data.

BACKGROUND OF THE INVENTION

This invention relates to the area of internet based commerce. Specifically, this invention enables a method and system for automatically filling in and submitting forms presented by vendor sites in order to effect commercial transactions on the web.

The process of interacting with the web through a browser may be broadly conceptualized as two types of interactions. The first kind of interaction is based on a user finding information and collating it without subsequent interaction with the provider of the information. This is similar to reading a magazine or researching a library. The second kind of interaction is based upon a user requesting goods or services from the provider of the information on the web. Electronic commerce is based upon the confluence of both these activities.

From a user's perspective, the web is useful largely because of the ease at which it makes information available and the diversity of information it provides. Problems arise when the information is scattered in many places and not readily accessible or not easily searchable. The following issues impede the efficient use of data by users of the world wide web: (a) different data representations, (b) different vocabularies, (c) different levels of functionality (d) multiple locations, and (e) absence from the web.

In a co-owned, co-pending U.S. Patent Application Serial No. 08/724,923, entitled "Method and Apparatus for Structuring the Querying and Interpretation of Semistructured Information," Ashish Gupta, et. al. introduced Virtual Database Management System ("VDBMS") technology in which structure is added to semi-structured data, thereby making the data searchable using known techniques. Further, VDBMS technology enables data from multiple sites to be integrated together and made searchable via a common mechanism. This technology is applicable to non-web sources such as legacy data sources in Relational Database Management Systems ("RDBMS"), text files, feeds in systems like SII, word and other text processor documents, UNIX file systems, and so forth. The technology's broad applicability in integrating a multiplicity of sources has been proven in the market in publicly available services.

The flow of information from the user to providers of data is as important as the flow of information from providers to the user. The bidirectional exchange of data forms the basis of commerce in traditional media and online. For example, a purchase involves information flow from the store to the buyer, in the display of goods available, and from the buyer to the store, in that information is a credit card number or a check or cash to complete the transaction.

Currently, internet purchasers must visit multiple web sites in order to consummate a transaction. For example, a user desiring to purchase a book entitled "World Peace," and a CD-ROM entitled "Unplugged", desires to make these purchases efficiently and to get the best prices for these items. The user must visit many different vendors to determine who sells the items, select a particular vendor for each item based on separately visiting the vendors, fill in multiple forms for the different vendors, each of which requires the user to enter the same information and finally track multiple transactions.

Using the search methods described in U.S. Patent Application No. 08/724,923, the user can find the best price for any item available from many vendors. The user is able to seamlessly query multiple different vendor data to make a decision, simplifying the decision process. However, purchasing the items still requires that the user interact with multiple web site "shopping carts," and fill in the required information multiple times. For example, the user must give her name, address, credit card number and click the "Buy it" button for each of the vendors and deal with their order entry forms.

What is needed is a method to enable a user shopping for items from different vendors' Web sites to automatically fill in order forms and then to purchase these items without having to browse and interact with different sites.

SUMMARY OF THE INVENTION

According to the invention, a method of automatically filling in on-line forms presented by web pages in an internet transactional environment by determining based upon selectable criteria a form identifier corresponding to a particular on-line form, and thereupon, for each form so identified, identifying one or many corresponding match patterns with which a page containing a target on-line form is parsed to obtain a plurality of attributes, and thereupon, for each attribute obtained in the parsing step, indexing into a database to obtain user information which may be used to fill in the target form.

The above approach has many advantages:

A key advantage of systems according to the present invention is that the user does not have to fill in multiple forms in order to effect internet transactions.

A further advantage of the present invention is that the user does not have to interact with multiple dissimilar interfaces.

A yet further advantage of the present invention is that the user can shop across multiple vendors without repeatedly entering purchase information.

The invention will be better understood with reference to the following detailed description and its accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1A depicts a representative client server relationship in accordance with a particular embodiment of the invention;

Fig. 1B depicts a functional perspective of the representative client server relationship in accordance with a particular embodiment of the invention;

Fig. 1C depicts a functional perspective of the components of a particular embodiment of the invention;

Fig. 1D depicts a plurality of relationships among data in accordance with a particular embodiment of the invention;

Figs. 2A - 2D depict representative forms in accordance with a particular embodiment of the invention;

Figs. 3A - 3D depict flowcharts of processing in accordance with a particular embodiment of the invention.

DESCRIPTION OF THE SPECIFIC EMBODIMENTS

1.0 Introduction

The present invention provides a method for automatically filling in information into forms presented by vendor web sites in order to effect commercial transactions on the web. Systems according to the present invention enable online shoppers to make selections and purchase products from a plurality of vendor sources using a common interface program without requiring the user to repeatedly fill in redundant information into purchasing forms presented by vendor web sites. A particular embodiment according to the invention has been reduced to practice and will be made available under the trade name "AutoScribe."™ Table 1 provides a definitional list of certain terms used herein:

Attribute	A blank space in a form, used to hold information, such as mailing address.
Property	A piece of user meta data.
Transformation Function	A function which when applied to user meta data yields a value to fill into a form.

Table 1

1.1 Hardware Overview

The method for automating form filling in order to effect commercial transactions on the web is implemented in the Perl and Java programming languages and is operational on a computer system such as shown in Fig. 1A. This invention may be implemented in a client-server environment, but a client-server environment is not essential. Fig. 1A shows a conventional client-server computer system which includes a server 20 and numerous clients, one of which is shown as client 25. The use of the term "server" is used in the context of the invention, wherein the server receives queries from

(typically remote) clients, does substantially all the processing necessary to formulate responses to the queries, and provides these responses to the clients. However, server 20 may itself act in the capacity of a client when it accesses remote databases located at another node acting as a database server.

The hardware configurations are in general standard and will be described only briefly. In accordance with known practice, server 20 includes one or more processors 30 which communicate with a number of peripheral devices via a bus subsystem 32. These peripheral devices typically include a storage subsystem 35, comprised of memory subsystem 35a and file storage subsystem 35b, which hold computer programs (e.g., code or instructions) and data, set of user interface input and output devices 37, and an interface to outside networks, which may employ Ethernet, Token Ring, ATM, IEEE 802.3, ITU X.25, Serial Link Internet Protocol (SLIP) or the public switched telephone network. This interface is shown schematically as a "Network Interface" block 40. It is coupled to corresponding interface devices in client computers via a network connection 45.

Client 25 has the same general configuration, although typically with less storage and processing capability. Thus, while the client computer could be a terminal or a low-end personal computer, the server computer is generally a high-end workstation or mainframe, such as a SUN SPARC™ server. Corresponding elements and subsystems in the client computer are shown with corresponding, but primed, reference numerals.

The user interface input devices typically includes a keyboard and may further include a pointing device and a scanner. The pointing device may be an indirect pointing device such as a mouse, trackball, touchpad, or graphics tablet, or a direct pointing device such as a touchscreen incorporated into the display. Other types of user interface input devices, such as voice recognition systems, are also possible.

The user interface output devices typically include a printer and a display subsystem, which includes a display controller and a display device coupled to the controller. The display device may be a cathode ray tube (CRT), a flat-panel device such as a liquid crystal display (LCD), or a projection device. Display controller provides control signals to the display device and normally includes a display memory for storing the pixels that appear on the display device. The display subsystem may also provide non-visual display such as audio output.

The memory subsystem typically includes a number of memories including a main random access memory (RAM) for storage of instructions and data during program execution and a read only memory (ROM) in which fixed instructions are stored. In the case of Macintosh-compatible personal computers the ROM would include portions of the operating system; in the case of IBM-compatible personal computers, this would include the BIOS (basic input/output system).

The file storage subsystem provides persistent (non-volatile) storage for program and data files, and typically includes at least one hard disk drive and at least one floppy disk drive (with associated removable media). There may also be other devices such as a CD-ROM drive and optical drives (all with their associate removable media). Additionally, the computer system may include drives of the type with removable media cartridges. The removable media cartridges may, for example be hard disk cartridges, such as those marketed by Syquest and others, and flexible disk cartridges, such as those marketed by Iomega. One or more of the drives may be located at a remote location, such as in a server on a local area network or at a site of the Internet's World Wide Web.

In this context, the term "bus subsystem" is used generically so as to include any mechanism for letting the various components and subsystems communicate with each other as intended. With the exception of the input devices and the display, the other components need not be at the same physical location. Thus, for example, portions of the file storage system could be connected via various local-area or wide-area network media, including telephone lines. Similarly, the input devices and display need not be at the same location as the processor, although it is anticipated that the present invention will most often be implemented in the context of PCs and workstations.

Bus subsystem 32 is shown schematically as a single bus, but a typical system has a number of buses such as a local bus and one or more expansion buses (e.g., ADB, SCSI, ISA, EISA, MCA, NuBus, or PCI), as well as serial and parallel ports. Network connections are usually established through a device such as a network adapter on one of these expansion buses or a modem on a serial port. The client computer may be a desktop system or a portable system.

The user interacts with the system using interface devices 37' (or devices 37 in a standalone system). For example, client queries are entered via a keyboard, communicated to client processor 30', and thence to network interface 40' over bus

subsystem 32'. The query is then communicated to server 20 via network connection 45. Similarly, results of the query are communicated from the server to the client via network connection 45 for output on one of devices 37' (say a display or a printer), or may be stored on storage subsystem 35'.

5

1.2 Software Architecture

Fig. 1B is a functional diagram of the computer system of Fig. 1A. Fig. 1B depicts a server 20, and a representative client 25 of a multiplicity of clients which may interact with the server 20 via the internet 45 or any other communications method. 10 Blocks to the right of the server are indicative of the processing components and functions which occur in the server's program and data storage indicated by block 35a in Fig. 1A. A TCP/IP "stack" 44 works in conjunction with Operating System 42 to communicate with processes over a network or serial connection attaching Server 20 to internet 45. Web server software 46 executes concurrently and cooperatively with other 15 processes in server 20 to make data objects 50 and 51 available to requesting clients. A Common Gateway Interface (CGI) script 55 enables information from user clients to be acted upon by web server 46, or other processes within server 20. Responses to client queries may be returned to the clients in the form of a Hypertext Markup Language (HTML) document outputs which are then communicated via internet 45 back to the 20 user.

Client 25 in Fig. 1B possesses software implementing functional processes operatively disposed in its program and data storage as indicated by block 35a' in Fig. 1A. TCP/IP stack 44', works in conjunction with Operating System 42' to communicate with processes over a network or serial connection attaching Client 25 to internet 45. 25 Software implementing the function of a web browser 46' executes concurrently and cooperatively with other processes in client 25 to make requests of server 20 for data objects 50 and 51. The user of the client may interact via the web browser 46' to make such queries of the server 20 via internet 45 and to view responses from the server 20 via internet 45 on the web browser 46'.

30 Fig. 1C depicts a functional perspective of the software components resident in storage subsystem 35' of client 25 or storage subsystem 35 server 20, which cooperatively perform automated transaction processing in accordance with a particular embodiment of the invention. Transaction integrator 100 performs processing of

information in conjunction with one or more wrapper programs 140, 150 and 160 configured to specific merchandising sites 139, 149 and 159. Automated form filling component 110 interacts with User Meta-database 170 and User Selection database 180 in order to perform the filling in of online forms presented by various shopping sites. Transaction integrator 100 controls responding to the user's requests to search for various merchandise, obtaining information from the user about the user's merchandise selections from the search results and building information into the User Meta-database 170 and the User Selection database 180.

Fig. 1D depicts a plurality of relationships between data objects in the User Meta-database 170. Relationship 60 associates a form finding criterion, here a form URL 64, with a form identifier, here a form name 62. Relationship 70 associates a pattern for matching 74 with a form name 72. Relationship 80 associates a form name 82 with a property name 86, an attribute name 84 and a transform function 88. Attribute 84 is a field in a form which we would like to fill in automatically, for example a space for the user's name. Property 86 is a piece of user meta data, stored in User Meta-database 170, for example, a name of a user. Transformation function 88 converts a property into a value for filling in a field in a form. For example, consider a form that has an attribute called "name" which is of a type "last name, first name." Further, consider user meta data that unique to each user comprising a first property, "first-name," and a second property, "last-name." A value to fill into the form for the "name" attribute is obtained by concatenating the property "last-name," followed by a "comma," followed by the property "first-name." The concatenation process is a transformation function. Using this technique, the same user meta data may be specified in different ways by different forms. Applying these techniques, provides the ability to specify how to modify properties, or meta data, to fill in a wide variety of forms. Finally, relationship 90 associates a User ID 92 with a form ID 94, and a plurality of property-value tuples 96, 98 and 99.

2.0 On-line Transactions Forms

Figs. 2A and 2B depict representative forms for transactions with online merchants. The usual method of consummating a purchase order is for the user to fill in the fields in a series of forms with the required information and click a "submit" button to complete the purchase. Fig. 2A depicts a registration form 201, having a plurality of

fields in which the user enters information. The user must enter her name in a name field 202, her mailing information in address fields 204, 206, 208, 210 and 212, her telephone number in a telephone number field 214, then click a "done" button 216 to submit form 201 to the server 20. Fig. 2B depicts a shipping and account information form 203, having a plurality of fields in which the user must enter information. The user enters her desired method of shipment by selecting the corresponding button in shipment box 220. Next, she indicates the type of account she wishes to establish using buttons 222 and 224. Then, she enters her payment information in credit card type button 226, card number field 228, expiration field 230, name field 232 and issuing bank field 234. Thus, it is not one form that is filled in, but a series of forms.

3.0 Automating On-line Transactions

3.1 Automating A Single On-line Transaction

Fig. 3A depicts a flowchart 301 of the process steps in executing an automated transaction. In a step 312, the user performs a search for items of interest using a search program as is known in the art. Then, in a step 314, a result page depicting the results of the search performed in step 312, such as result page 205 of Fig. 2C, is displayed to the user. Next, in a step 316, the user makes a selection of an item from the result page using a mouse, or other method. Next, in a step 318, a transaction is initiated with a site corresponding to a vendor offering the merchandise selected by the user. For example, in the sample result page 205, when a user clicks a "Buy it" link 240, a request to buy the selected product is initiated at the site of the vendor corresponding to the item selected by the user. Processing for this step is depicted in greater detail in a flowchart 305 in Fig. 3C.

3.2 Transactions with Multiple On-line Vendors

Multiple purchases across different vendors are integrated based upon the concept of a "virtual check-out counter," from which all transactions are consummated. The virtual checkout counter enables the user to make payments at a single point even though returns and product question transactions are handled by individual vendor sites. Fig. 3B depicts a flowchart 303 of steps in virtual check-out counter processing. In a step 322, the user performs a search for items of interest using a search program as is known in the art. Then, in a step 324, a result page depicting the results of the search

performed in step 322, such as result page 206 of Fig. 2D, is displayed to the user. Next, in a step 325, the user's selection of an item from the result page 206 by using a mouse to click an "Add it" icon 242, or other method, is added to a list of items to purchase. Then, in a step 326, the list is parsed for selection data. Next, in a step 328, selection data for the purchase request is stored into the User Selection database 180. Next, in a decisional step 330, a determination is made whether the user has finished making selections. If the user makes further selections, the processing depicted by steps 322 - 330 of flowchart 303 is performed for each selection made by the user. Otherwise, responsive to the user's request to "check out," in a decisional step 332, a determination is made if any selections made by the user require transaction processing. In a step 334, transaction processing is performed for each selection made by the user in steps 322-330 of flowchart 303. Flowchart 305 of Fig. 3C depicts the transaction processing of step 334 in greater detail. Otherwise, when no further user selections remain, processing returns.

3.3 Automating Transaction Form Filling

Fig. 3C depicts a flowchart 305 depicting the processing for completing a transaction with a vendor on behalf of a user. In a decisional step 342, a determination is made whether there are any remaining forms which must be filled in to complete the transaction. If a form must be filled in, then in a step 344, the form is filled in by processing detailed in Fig. 3D. Next, processing returns to decisional step 342. When decisional step 342 determines that no further forms remain, all forms required by the vendor site have been filled in. Processing then continues with an optional step 346, which displays a screen to prompt the user to confirm the purchase. Finally, in a step 348, the transaction with the vendor site is completed and confirmation information returned by the vendor is stored for subsequent tracking.

3.4 Automated Order Form Filling

Forms associated with a vendor's site corresponding to product selections made by a user are automatically filled in with the information stored in User Meta-database 170 and User Selection database 180, such as the name, credit card number, and address of a user, using relationships 60, 70, 80 and 90 depicted in Fig. 1D. Fig. 3D depicts a flowchart 307 of the process steps for automated form filing according to a

particular embodiment of the invention. In a step 350, the appropriate form identifier for a particular vendor is determined based upon a selectable criterion using relationship 60. Relationship 60 associates the criterion of form URL 64 with a form identifier, form name 62. Next, in a step 352, the form identifier determined in step 350 is used to determine one or more corresponding matching patterns using relationship 70. Relationship 70 associates form identifier form name 72, which will be the form identifier determined in step 350, with pattern 74. Next, in a step 354, pattern 74 is matched against a page web page containing a form of interest which is to be filled in. In a decisional step 356, if no match is found with the pattern 74, then an error condition is returned, so that a system administrator can be made aware that there is a form for which no matching pattern exists. Otherwise, in a step 358, the page is parsed in order to obtain a plurality of attributes. Then, in a step 359, properties are identified using relationship 80 to identify those required to fill in the target form. In a step 360, a value is obtained for each property using relationship 90 by matching the form identifier to a form name 94 and reading property - value pairs 96, 98 and 99. Next, in a step 362, the properties determined in step 358 are transformed using relationship 80 to yield values for each attribute in the target form by applying transformation function 88 corresponding to property name 86 matching the property of interest in relationship 80 for the particular form identifier form name 82. The result is used to fill in the attribute corresponding to attribute name 84. Finally, in a step 364, the target form is filled in with property values obtained in step 362. Then processing returns.

3.4.1 Submitting Forms Using A Wrapper

In an alternative embodiment, the concept of a wrapper, a program which fills in and submits forms in order to accumulate information from web sites, may be used to complete a purchase transaction. The data to be filled into each form is obtained from the User Meta-database 170 and User Selection database 180. Wrapper programs are described in detail in a co-owned, co-pending U.S. Patent Application No. 08/724,943, in the name of Ashish Gupta, et. al., entitled "Method and Apparatus for Structuring the Querying and Interpretation of Semistructured Information," which is incorporated herein by reference in its entirety for all purposes.

According to this embodiment, a wrapper program is constructed for each vendor to capture the logic for the forms that need to be filled to consummate a

purchase. A second wrapper program is constructed for each site to perform information-gathering. The transaction-wrapper exercises different parts and different functionality of the site than the information-gathering wrapper. Any site can have multiple wrappers built for it, each of which gets different information or performs a different function. Constructing wrappers which fill in and submit forms is described in greater detail in a co-owned, co-pending U.S. Patent Application No. 08/995,868, in the name of Ashish Gupta, et. al., entitled "Method for Data Gathering Around Forms and Search Barriers," which is incorporated herein by reference in its entirety for all purposes.

According to this embodiment, the user's clicking the "Buy it" link causes the execution of the transaction-wrapper that fills the correct forms in the correct order, ultimately bringing the user to the point where the user can confirm the transaction. All intermediate steps of filling forms with user-specific information is performed by the wrapper.

3.4.2 Applications in Select Embodiments

In a particular embodiment, the automated form filling technology may be used in a proxy server to intercept incoming pages. In an alternative embodiment, the automated form filling technology may be used in a browser program to screen pages before display to the user.

4.0 Conclusion

In conclusion the present invention provides for a method of automatically filling in forms in conducting transactions with multiple vendor sites using a common interface. An advantage of the present invention is that there is a single point of user profile information for submission. A further advantage of the present invention is that it enables the user to buy a collection of items by a given date at the minimum cost, including tax and shipping charges. A yet further advantage of the present invention is that it employs a single point to check out instead of multiple points thus saving time and money for everyone concerned.

Other embodiments of the present invention and its individual components will become readily apparent to those skilled in the art from the foregoing detailed description. As will be realized, the invention is capable of other and different

embodiments, and its several details are capable of modifications in various obvious respects, all without departing from the spirit and the scope of the present invention. Accordingly, the drawings and detailed description are to be regarded as illustrative in nature and not as restrictive. It is therefore not intended that the invention be limited except as indicated by the appended claims.

WHAT IS CLAIMED IS:

1. A method of automatically filling in on-line forms in an internet transactional environment, said on-line forms being contained in a plurality of pages, presented by one or many internet sites, comprising the steps of:

determining based upon selected criterion a form identifier corresponding to a particular on-line form;

for each form identified in the determining step, identifying a plurality of corresponding match patterns;

matching each match pattern identified in the identifying step to a particular page containing said particular on-line form;

parsing said particular page to obtain a plurality of attributes;

for each attribute obtained in the parsing step, indexing into a database to obtain user information;

filling in said particular on-line form with said user information obtained in the indexing step.

2. The method of claim 1 wherein said selected criterion further comprises a Uniform Resource Locator (URL).

3. The method of claim 1 wherein said forms are presented by online sites to gather information to complete a transaction.

4. The method of claim 1 further comprising the steps of:

recognizing a subsequent form presented by said on-line site;

performing the determining through filling steps repeatedly for said subsequent form.

5. The method of claim 1 wherein said online sites are world wide web sites.

6. A system for automatically filling in on-line forms in an internet transactional environment, said on-line forms being contained in a plurality of pages, presented by one or many internet sites, comprising:

at least one client and at least one server, said client and said server operatively disposed to:

determining based upon selected criterion a form identifier corresponding to a particular on-line form;

for each form identified in the determining step, identifying a plurality of corresponding match patterns;

matching each match pattern identified in the identifying step to a particular page containing said particular on-line form;

parsing said particular page to obtain a plurality of attributes;

for each attribute obtained in the parsing step, indexing into a database to obtain user information;

filling in said particular on-line form with said user information obtained in the indexing step.

7. The system of claim 6 wherein said selected criterion further comprises a Uniform Resource Locator (URL).

8. The system of claim 6 wherein said forms are presented by online sites to gather information to complete a transaction.

9. The system of claim 6 further comprising the steps of:

recognizing a subsequent form presented by said on-line site;

performing the determining through filling steps repeatedly for said subsequent form.

10. The system of claim 6 wherein said online sites are world wide web sites.

11. A computer programming product for automatically filling in on-line forms in an internet transactional environment, said on-line forms being contained in a plurality of pages, presented by one or many internet sites, comprising:

a computer readable storage medium;

code for determining based upon selected criterion a form identifier corresponding to a particular on-line form;

code for identifying a plurality of corresponding match patterns, for each form identified by the determining code;

code for matching each match pattern identified by the identifying code to a particular page containing said particular on-line form;

code for parsing said particular page to obtain a plurality of attributes;

code for indexing into a database to obtain user information, for each attribute obtained in the parsing step;

code for filling in said particular on-line form with said user information obtained in the indexing step.

12. The computer programming product of claim 11 wherein said selected criterion further comprises a Uniform Resource Locator (URL).

13. The computer programming product of claim 11 wherein said forms are presented by online sites to gather information to complete a transaction.

14. The computer programming product of claim 11 further comprising:

code for recognizing a subsequent form presented by said on-line site;

code for invoking the code for determining through the code for filling repeatedly for said subsequent form.

15. The computer programming product of claim 11 wherein said online sites are world wide web sites.

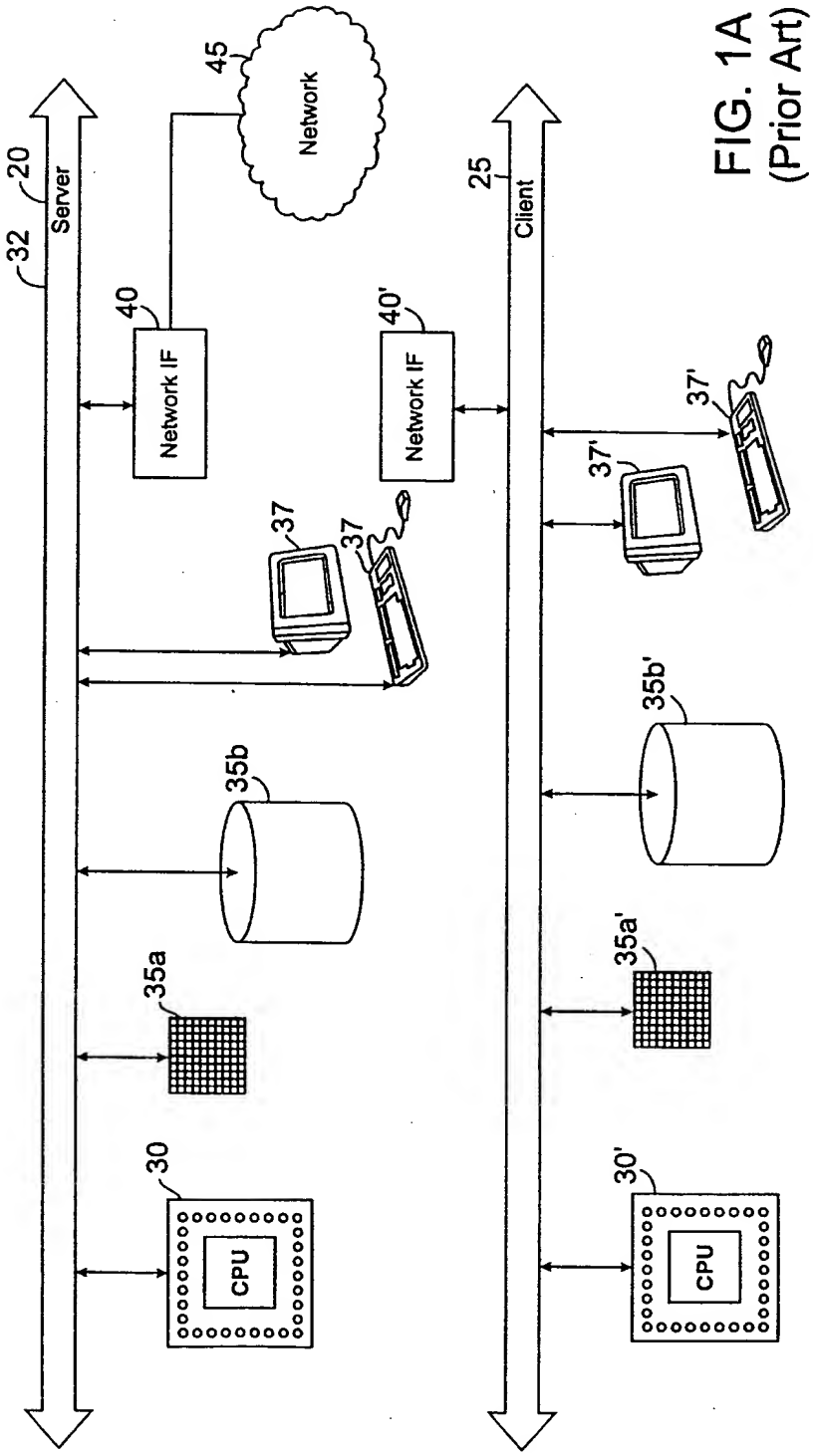


FIG. 1A
(Prior Art)

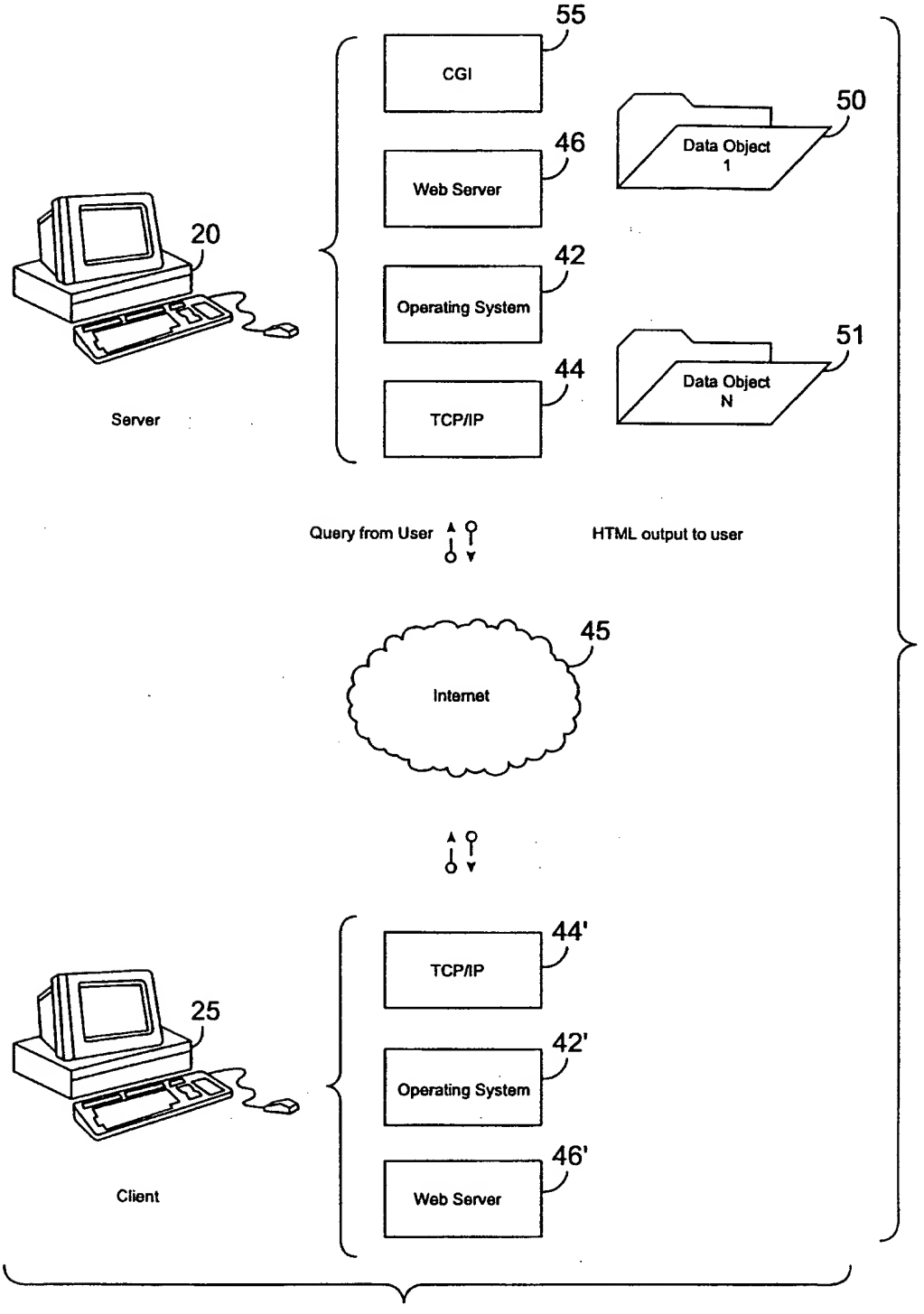


FIG. 1B
(Prior Art)

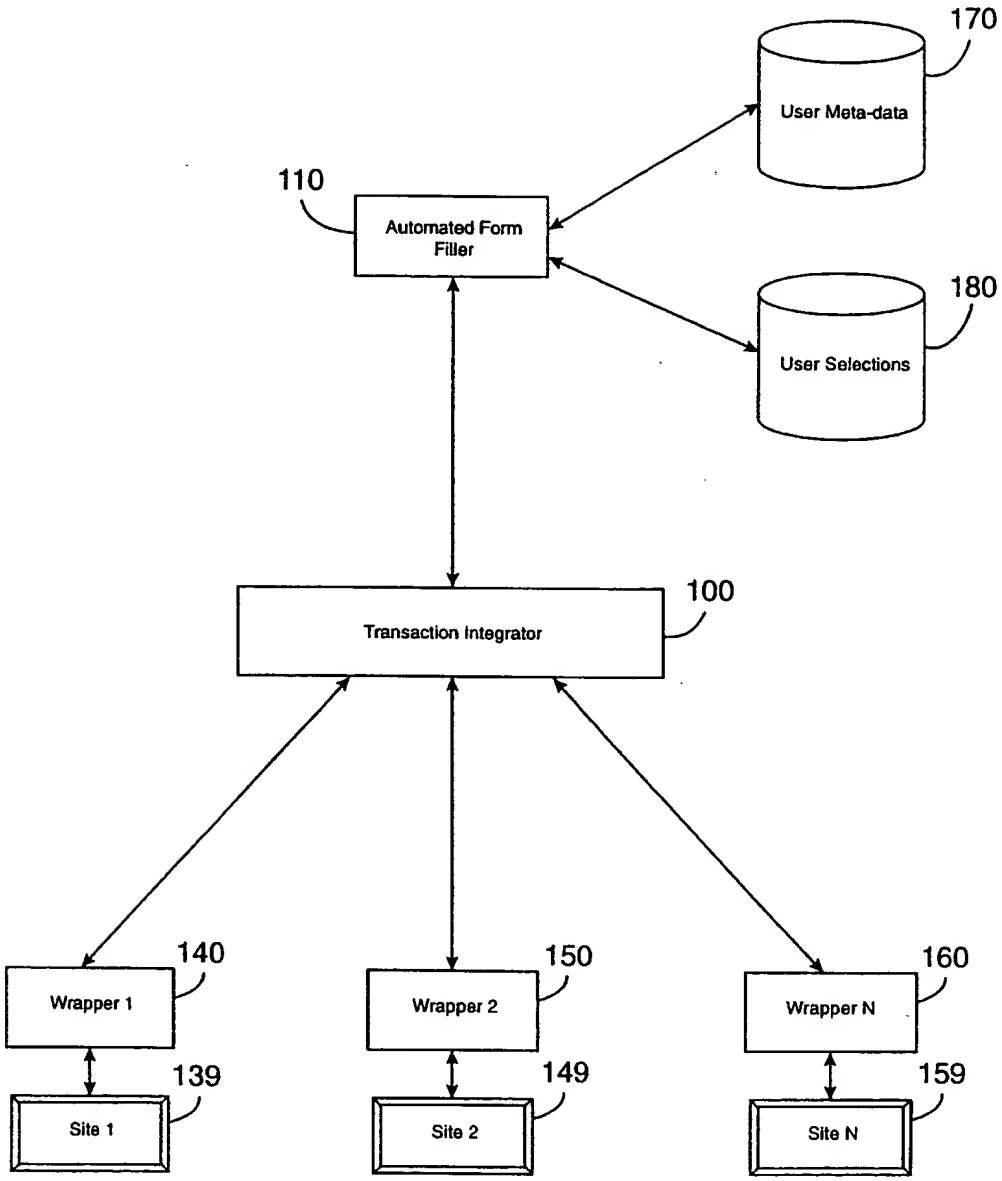

170
User Meta-data
110
Automated Form Filler
180
User Selections
Transaction Integrator
100
140
Wrapper 1
150
Wrapper 2
160
Wrapper N
139
Site 1
149
Site 2
159
Site N

FIG. 1C

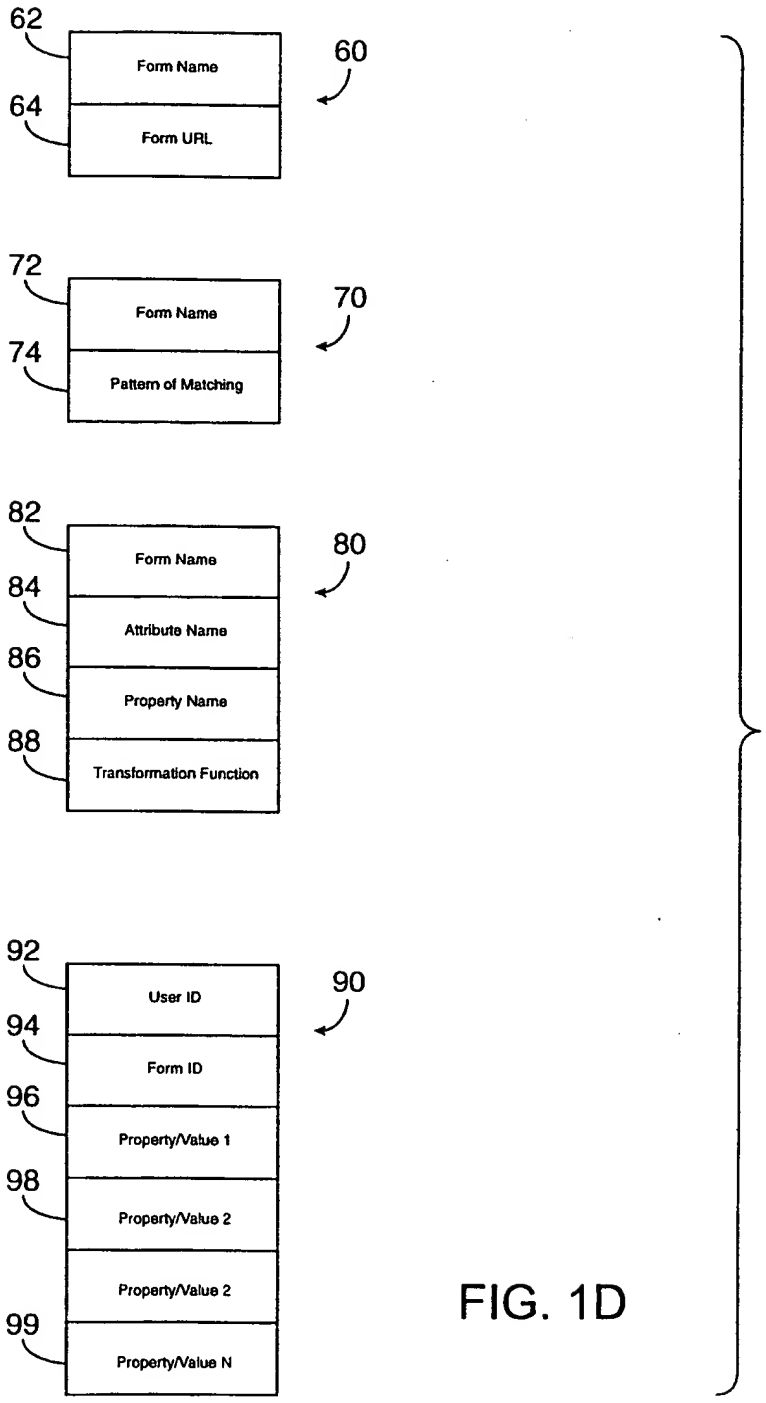

62
Form Name
60
64
Form URL
72
Form Name
70
74
Pattern of Matching
82
Form Name
80
84
Attribute Name
86
Property Name
88
Transformation Function
92
User ID
90
94
Form ID
96
Property/Value 1
98
Property/Value 2
Property/Value 2
99
Property/Value N

FIG. 1D

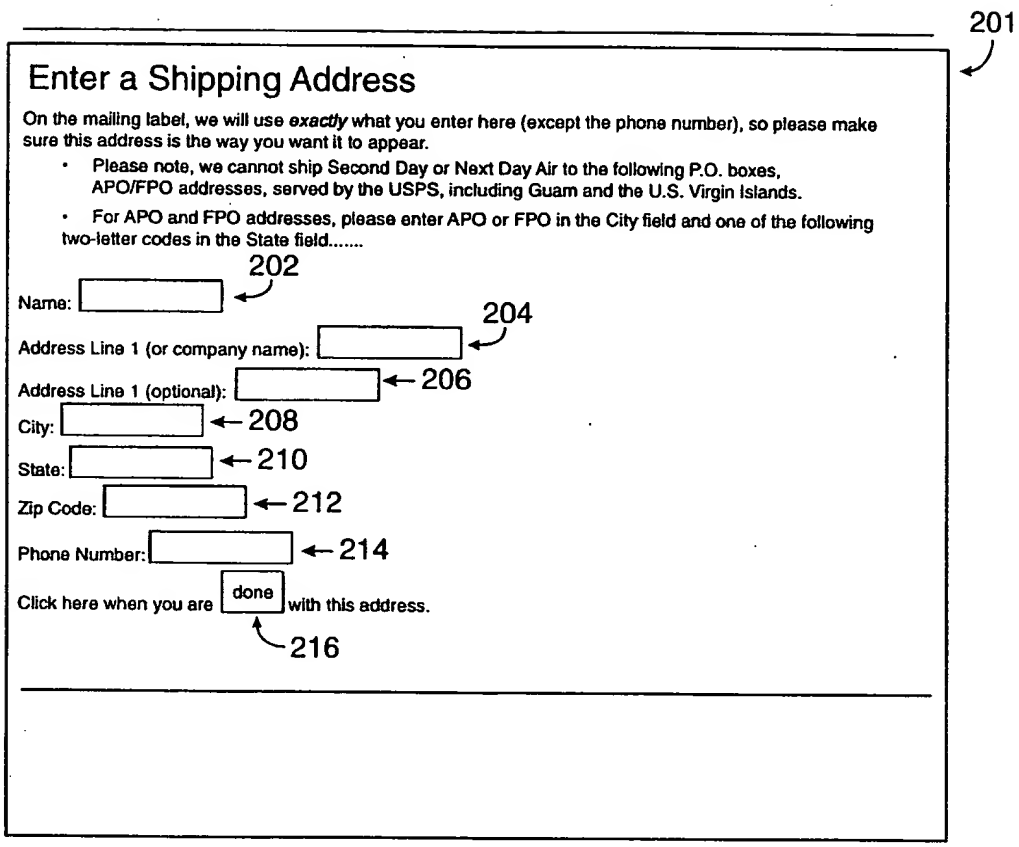


FIG. 2A
(Prior Art)

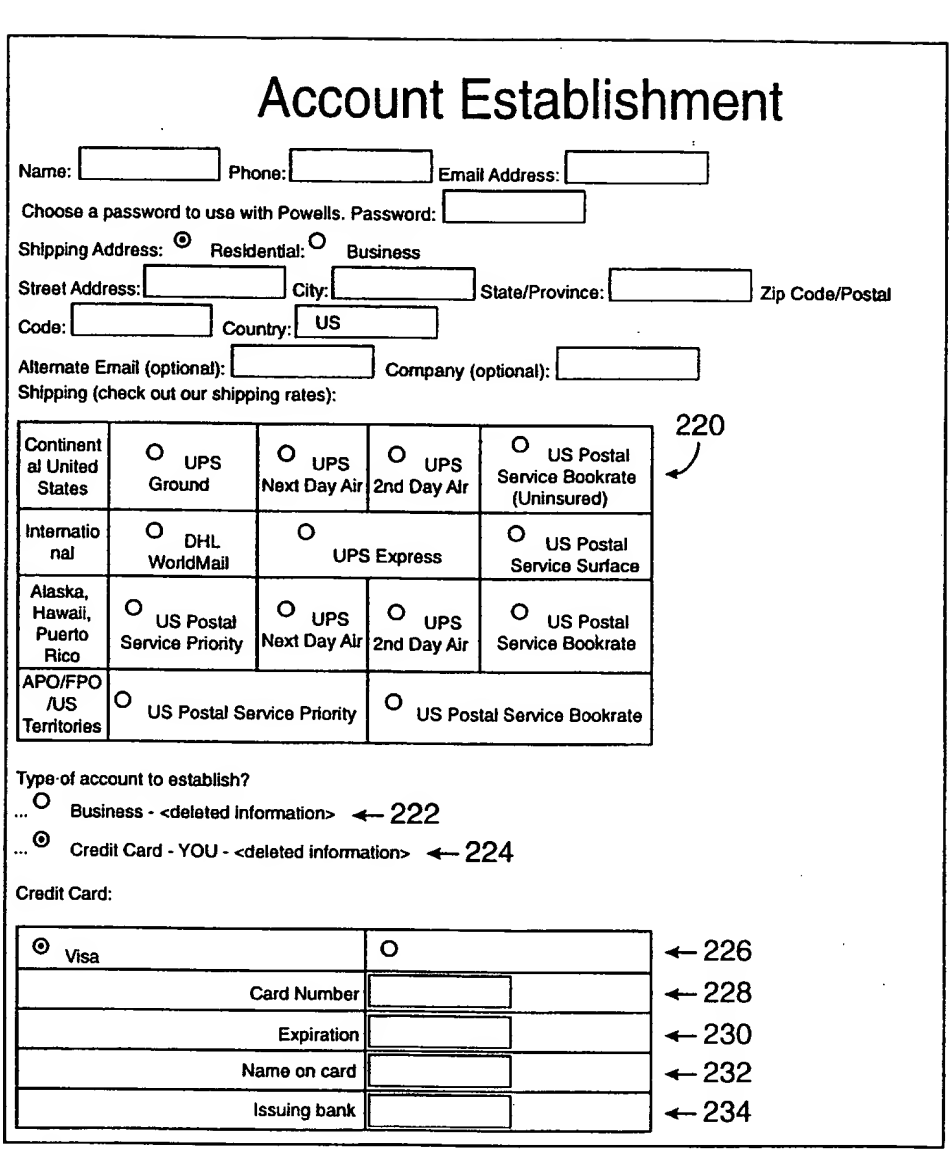
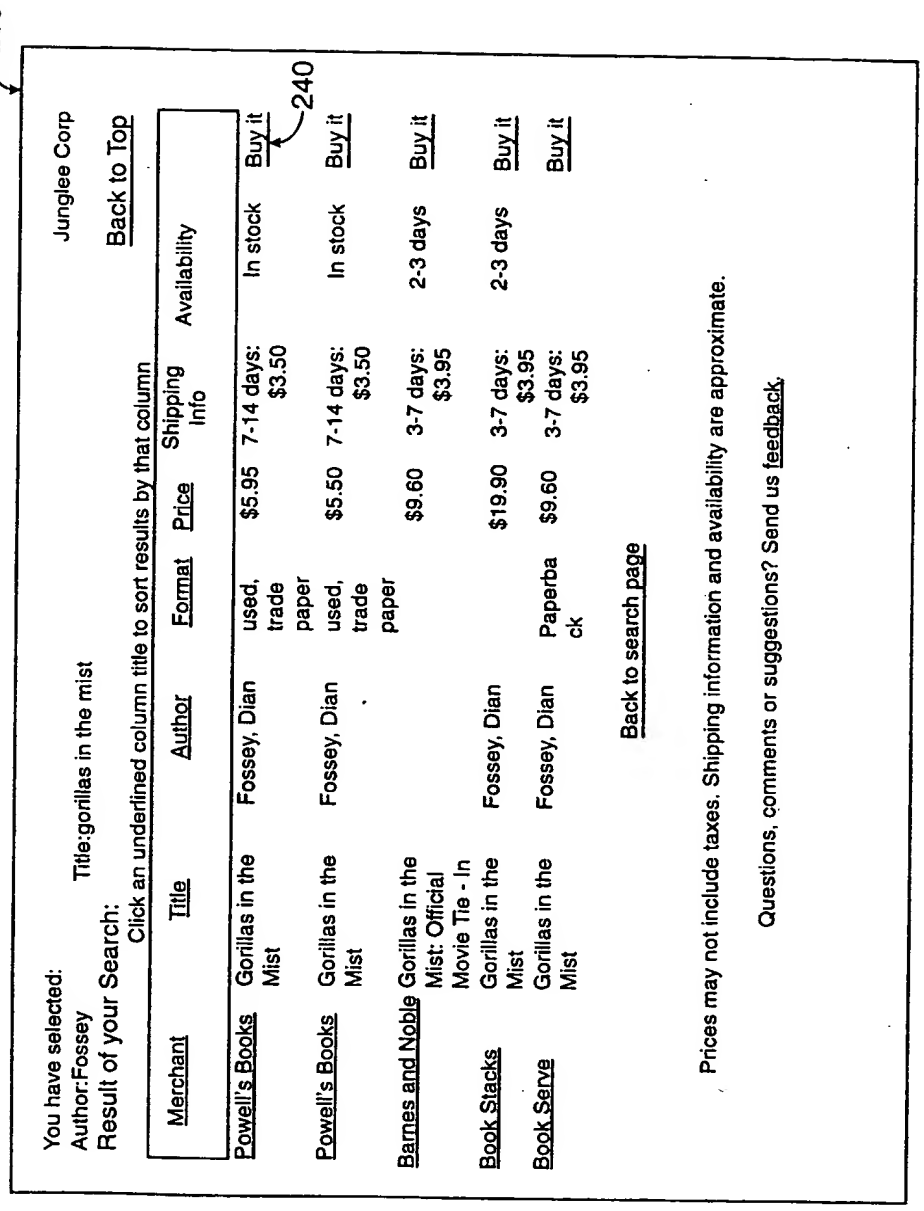


FIG. 2B
(Prior Art)


205
You have selected:
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Title:gorillas in the mist
Junglee Corp
Result of your Search:
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Author
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Shipping Info
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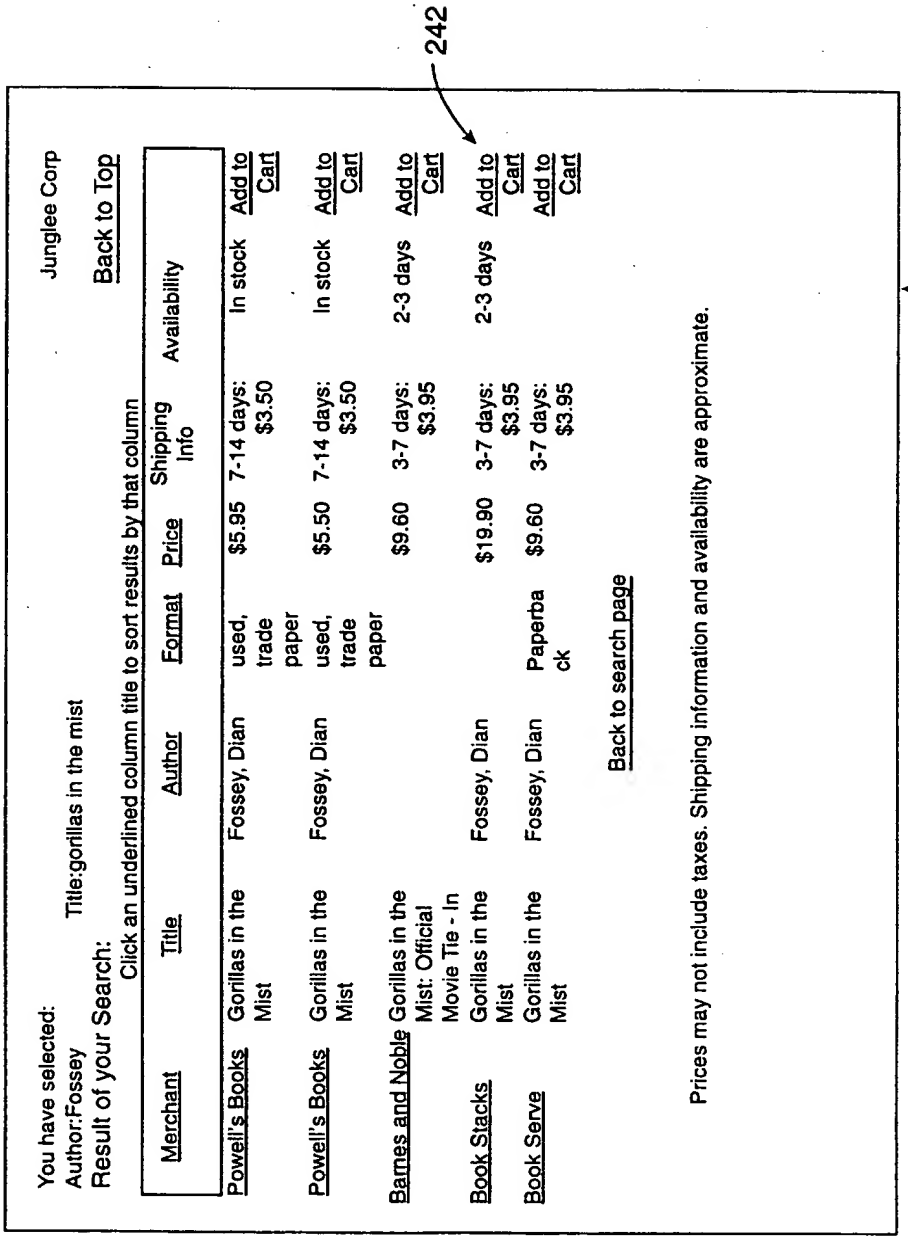
FIG. 2C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242
206

FIG. 2D

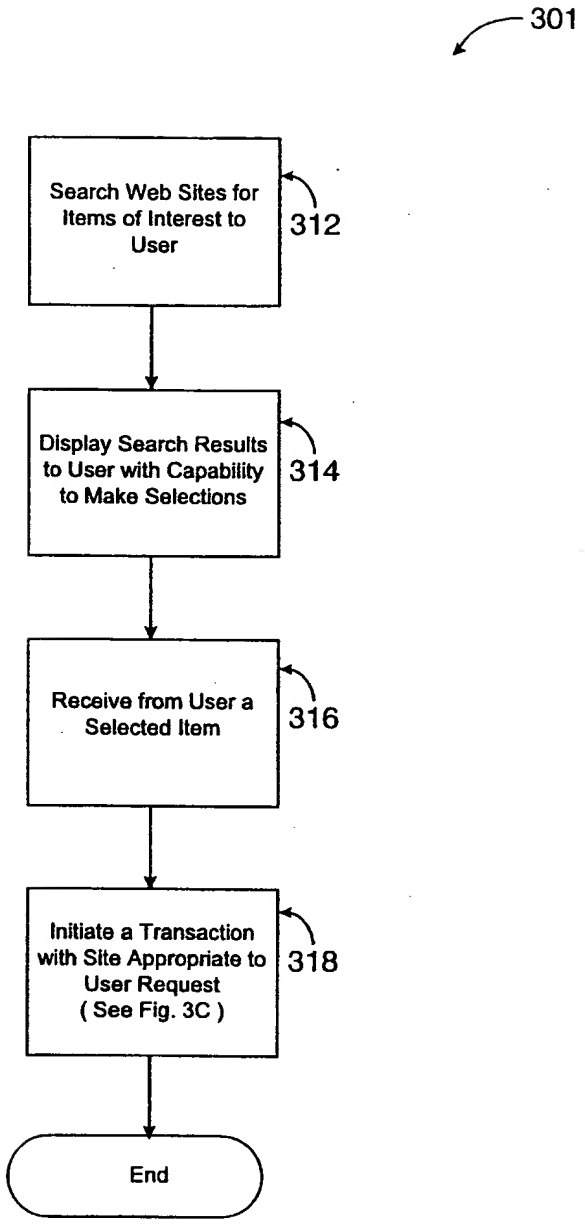
301
Search Web Sites for Items of Interest to User
312
Display Search Results to User with Capability to Make Selections
314
Receive from User a Selected Item
316
Initiate a Transaction with Site Appropriate to User Request (See Fig. 3C)
318
End

FIG. 3A

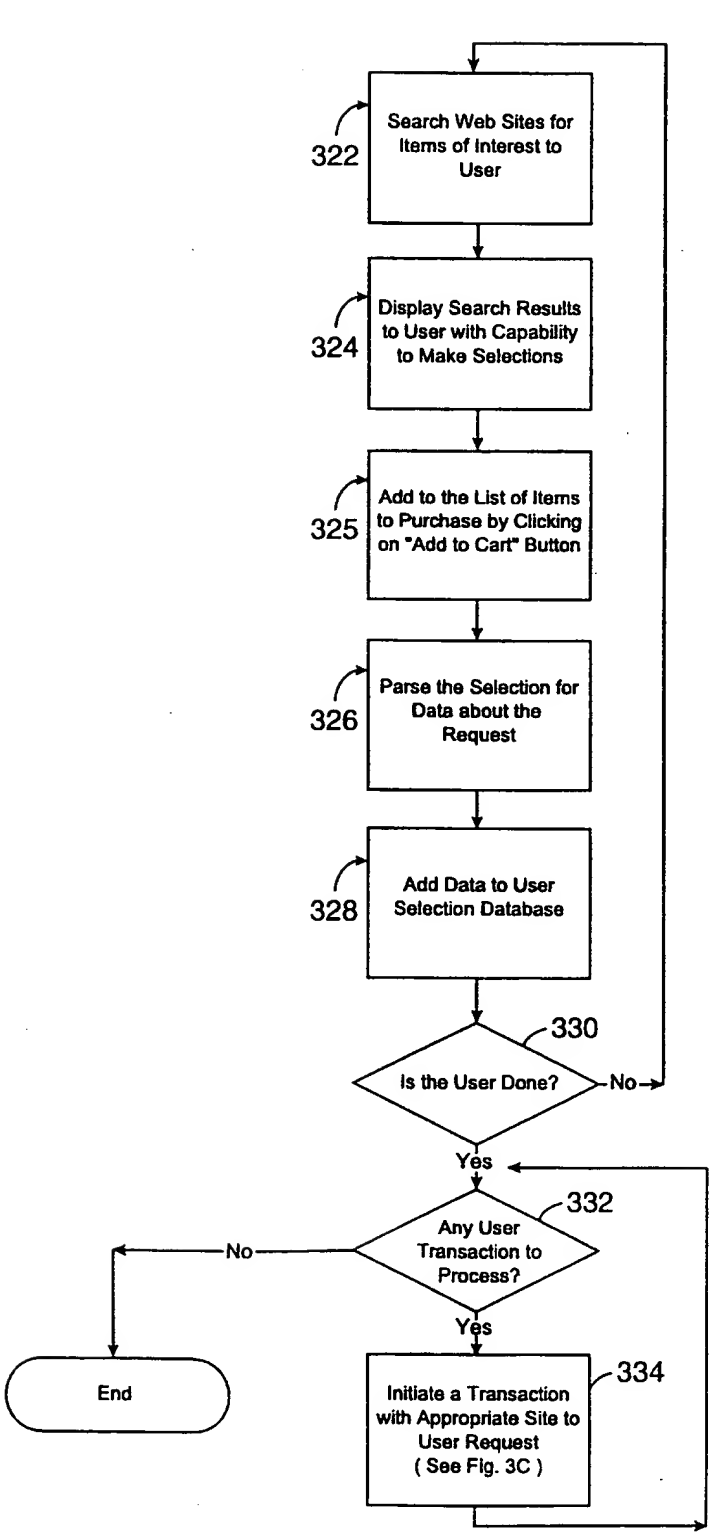
303
322
Search Web Sites for Items of Interest to User
324
Display Search Results to User with Capability to Make Selections
325
Add to the List of Items to Purchase by Clicking on "Add to Cart" Button
326
Parse the Selection for Data about the Request
328
Add Data to User Selection Database
330
Is the User Done?
No
Yes
332
Any User Transaction to Process?
No
Yes
End
334
Initiate a Transaction with Appropriate Site to User Request (See Fig. 3C)

FIG. 3B

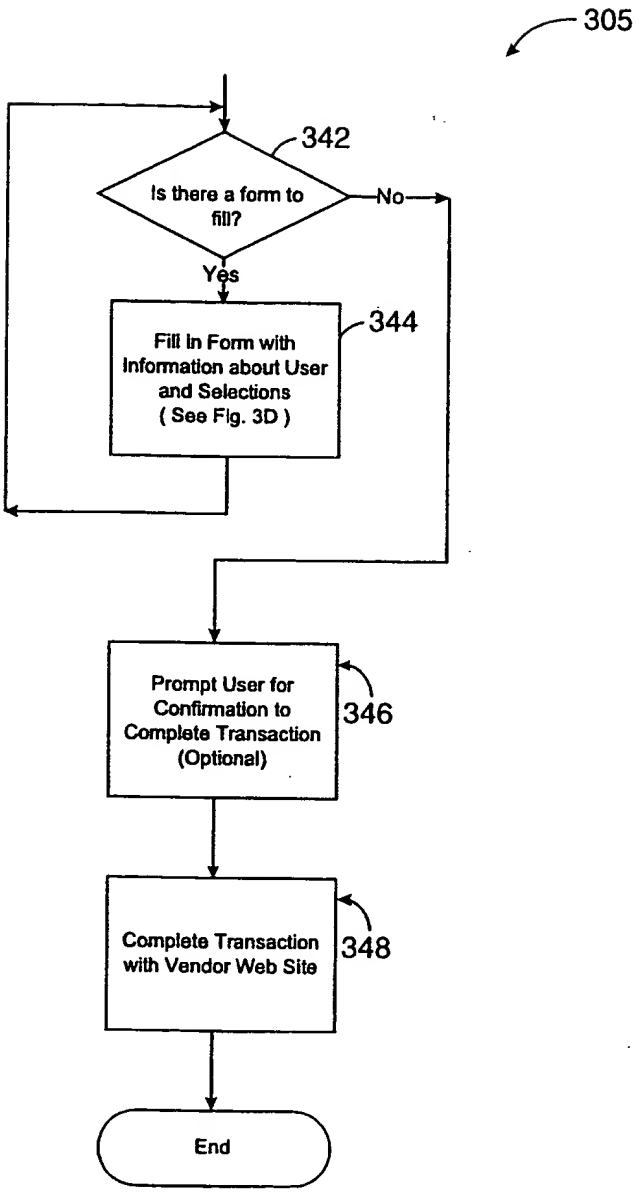
305
342
Is there a form to fill?
No
Yes
344
Fill In Form with Information about User and Selections (See Fig. 3D)
Prompt User for Confirmation to Complete Transaction (Optional)
346
Complete Transaction with Vendor Web Site
348
End

FIG. 3C

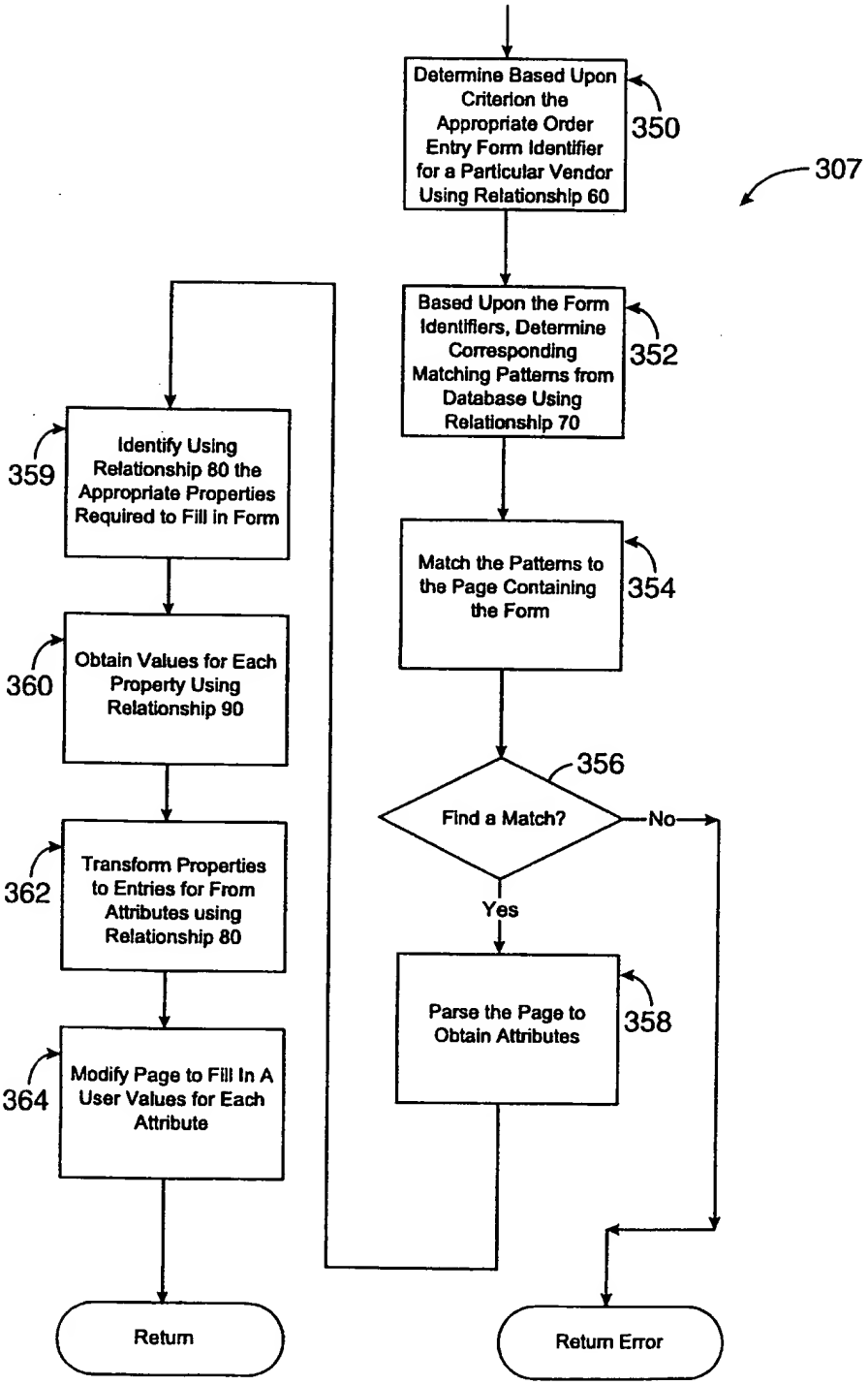
Determine Based Upon Criterion the Appropriate Order Entry Form Identifier for a Particular Vendor Using Relationship 60
350
307
Based Upon the Form Identifiers, Determine Corresponding Matching Patterns from Database Using Relationship 70
352
Match the Patterns to the Page Containing the Form
354
Find a Match?
356
No
Yes
Parse the Page to Obtain Attributes
358
Return Error
Identify Using Relationship 80 the Appropriate Properties Required to Fill in Form
359
Obtain Values for Each Property Using Relationship 90
360
Transform Properties to Entries for From Attributes using Relationship 80
362
Modify Page to Fill In A User Values for Each Attribute
364
Return

FIG. 3D

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/04489

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) :G06F 17/30, 60
US CL :705/26; 707/507, 513
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 705/26, 27, 37, 44; 707/507, 513

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
APS, NPL, USPAT, JPO, EPO, USOCR, DERWENT

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,E	US 5,794,259 A (KIKINIS) 11 August 1998, see entire document	1-15
A,E	US 5,758,328 A (GIOVANNOLI) 26 May 1998, see entire document	1-15
A,E	US 5,897,622 A (BLINN et al) 27 April 1999, see entire document	1-15
A,E	US 5,890,139 A (SUZUKI et al) 30 March 1999, see entire document	1-15
A,E	US 5,832,459 A (CAMERON et al) 03 November 1998, see entire document	1-15
A,E	US 5,794,207 A (WALKER et al) 11 August 1998, see entire document	1-15
A,E	US 5,745,681 A (LEVINE et al) 28 April 1998, see entire document	1-15

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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Date of the actual completion of the international search 10 MAY 1999	Date of mailing of the international search report 26 MAY 1999
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer JOSEPH FEILD Telephone No. (703) 305-3900

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